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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,448	02/19/2004	Isam R. Makhoulf	CM05888G	5155
22917	7590	07/28/2005	EXAMINER	
MOTOROLA, INC. 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			KHUU, HIEN DIEU THI	
			ART UNIT	PAPER NUMBER
			2863	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

8m

Office Action Summary	Application No. 10/782,448	Applicant(s) MAKHLOUF ET AL.	
	Examiner Cindy D. Khuu	Art Unit 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-23 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 11-14 is/are rejected.
- 7) ☒ Claim(s) 5-10 and 15-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/19/04 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/19/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1- 23, drawn to method of determining a frequency error over at least one frequency search space for a received signal, classified in class 702, subclass 69.
- II. Claims 24 and 25, drawn to a receiver, classified in class 702, subclass 189.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because all the limitations of I are not in II. The combination has a separate utility such as a channel estimator receiver for use in related communication systems.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Valerie Davis on June 23, 2005 a provisional election was made without traverse to prosecute the invention of I, claims 1-23. Affirmation of this election must be made by applicant in replying to this Office action. Claims 24 and 25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named

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inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings Objection

Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Figure 4 is objected to under 37 CFR 1.83(a) because it fails to show elements 400 and 402 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Maalej et al. (6,249,180).

With respect to claims 1 and 11, Maalej discloses a method for determining a frequency/timing error (Column 5: Lines 2-4)/(Column 4: Lines 38-39) over at least one frequency/timing search space for a received signal (Column 2: Lines 25-27), the method comprising the steps of: a) calculating a first noise estimation (Column 7: Lines 1-4) for a first frequency/timing offset (Column 6: Line 52) in a frequency/timing search space; b) calculating at least a second noise estimation for a second frequency/timing offset in said frequency/timing search space (Column 2: Lines 25-27); and c) determining a minimum noise estimation from said calculated noise estimations, wherein said frequency/timing error is the frequency/timing offset corresponding to said minimum noise estimation (Column 9: Lines 15-25, 34-41).

With respect to claim 2, Maalej further discloses a method comprising the step of using said determined frequency/timing error to perform a frequency/timing adjustment (Column 6: Lines 32-40).

With respect to claim 3, Maalej further discloses a method wherein said received signal has a center frequency/timing and said frequency/timing error is used to adjust said center frequency/timing (Column 4: Lines 4-12).

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With respect to claim 4, Maalej further discloses a method wherein said signal is received into a receiver having a channel estimation filter, and said channel estimation filter is frequency/timing adjusted using said frequency/timing error (Column 6: Lines 32-40).

Allowable Subject Matter

Claims 5-10 and 15-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 20-23 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, taken alone or in combination, fails to disclose or render obvious:

With respect to claims 5 and 15, a method comprising: performing steps a) and b) for a first channel characterization over a first frequency/timing search space and determining a corresponding first preliminary minimum noise estimation; performing steps a) and b) for at least a second channel characterization over a second frequency/timing search space and determining a corresponding second preliminary minimum noise estimation; and selecting the minimum noise estimation from said preliminary minimum noise estimations.

With respect to claims 6 and 16, a method wherein each said channel characterization is based on at least one of a different Doppler hypothesis and a different delay spread hypothesis.

With respect to claims 7 and 17, a method wherein the minimum noise estimation is selected based on weighting each of the preliminary noise estimations and comparing the weighted preliminary noise estimations.

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With respect to claims 8 and 18, a method comprising selecting a channel estimation filter design based on the channel characterization corresponding to said selected minimum noise estimation.

With respect to claims 9 and 19, a method wherein each of the frequency/timing offsets are uniformly spaced and are adjacent to each other in the frequency/timing search space.

With respect to claim 10, a method for determining a timing synchronization error for said received signal over at least one combined frequency and timing search space, wherein: said first noise estimation is calculated for a first frequency and timing offset pair in a combined frequency and timing search space; and said at least a second noise estimation is calculated for a second frequency and timing offset pair in said combined frequency and timing search space; and said timing error is the timing offset corresponding to said minimum noise estimation.

With respect to claim 20, a method for determining a frequency error and a timing synchronization error over at least one combined frequency and timing search space for a received signal, the method comprising the steps of: a) calculating a first noise estimation for a first frequency and timing offset pair in a combined frequency and timing search space; b) calculating at least a second noise estimation for a second frequency and timing offset pair in said combined frequency and timing search space; and c) determining a minimum noise estimation from said calculated noise estimations, wherein said frequency error is the frequency offset corresponding to said minimum noise estimation, and said timing error is the timing offset corresponding to said minimum noise estimation.

With respect to claim 21, a method for determining a frequency error over at least one frequency search space for a received signal, the method comprising the steps of: for a first channel characterization over a first frequency search space, calculating a first noise estimation for a first frequency offset in said first frequency search space; calculating at least a second noise estimation for a second frequency offset in said first frequency search space; and determining a corresponding first preliminary minimum noise estimation from said calculated noise estimations; for at least a second channel characterization over a second frequency search space, calculating a first noise estimation for a first frequency offset in said second frequency search space; calculating at least a second noise estimation for a second frequency

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offset in said second frequency search space; and determining a corresponding second preliminary minimum noise estimation from said calculated noise estimations; and selecting a minimum noise estimation from said preliminary minimum noise estimations, wherein said frequency error is the frequency offset corresponding to said minimum noise estimation.

With respect to claim 22, a method for determining a timing synchronization error over at least one timing search space for a received signal, the method comprising the steps of: for a first channel characterization over a first timing search space, calculating a first noise estimation for a first timing offset in said first timing search space; calculating at least a second noise estimation for a second timing offset in said first timing search space; and determining a corresponding first preliminary minimum noise estimation from said calculated noise estimations; for at least a second channel characterization over a second timing search space, calculating a first noise estimation for a first timing offset in said second timing search space; calculating at least a second noise estimation for a second timing offset in said second timing search space; and determining a corresponding second preliminary minimum noise estimation from said calculated noise estimations; and selecting a minimum noise estimation from said preliminary minimum noise estimations, wherein said timing error is the timing offset corresponding to said minimum noise estimation.

With respect to claim 23, a method for determining a frequency error and a timing synchronization error over at least one combined frequency and timing search space for a received signal, the method comprising the steps of: for a first channel characterization over a first combined frequency and timing search space, calculating a first noise estimation for a first frequency and timing offset pair in said first combined frequency and timing search space; calculating at least a second noise estimation for a second frequency and timing offset pair in said first combined frequency and timing search space; and determining a corresponding first preliminary minimum noise estimation from said calculated noise estimations; for at least a second channel characterization over a second combined frequency and timing search space, calculating a first noise estimation for a first frequency and timing offset pair in said second combined frequency and timing search space; calculating at least a second noise estimation for a second frequency and timing offset pair in said second combined frequency and timing search space; and determining a corresponding second preliminary minimum noise estimation from said calculated noise estimations; and

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selecting a minimum noise estimation from said preliminary minimum noise estimation, wherein said frequency error is the frequency offset corresponding to said minimum noise estimation and said timing error is the timing offset corresponding to said minimum noise estimation.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

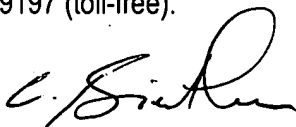
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Scott et al. (5,282,228), O'Shea et al. (6,654,432), Thomson et al. (US 2003/0058968), Goldberg et al. (6,741,842), Leake et al. (4,864,218).

Fax/Telephone Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khuu whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



7/22/05



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